

What is claimed is:

1. A method of fabricating a preform for use in manufacturing optical waveguide fiber, the method comprising the steps of:
  - depositing soot onto a substrate to form a soot glass body thereon;
  - removing the substrate from the soot body, thereby forming a centerline hole extending axially therethrough;
  - plugging at least one end of the centerline hole using at least one other glass body;
  - drying the soot body; and
  - consolidating the soot body to form a glass preform, wherein the at least other glass body is pre-deuterated.
2. The method of Claim 1 wherein a portion of the soot body sinters around and engages the at least one other glass body during the consolidating step.
3. The method of Claim 1 wherein the consolidating step further comprises forming a glass preform having a sealed centerline hole.
4. The method of Claim 1 wherein the plugging step further comprises plugging both ends of the centerline hole of the soot body using glass plugs, wherein at least one of the plugs is made of pre-deuterated glass.
5. The method of Claim 1 wherein the plugging step further comprises inserting plugs into each end of the centerline hole of the soot body, wherein at least one of the plugs is made of pre-deuterated glass, and wherein the consolidating step further comprises forming a glass preform having a sealed centerline hole.

6. The method of Claim 1 further comprising inserting first and second glass plugs into respective ends of the centerline hole of the soot body, then consolidating the soot body to form a glass preform, wherein a portion of the soot body sinters around and engages the first and second glass plugs, thereby sealing the centerline hole, wherein at least one of the glass plugs is deuterated.
7. The method of Claim 1 further comprising deuterating the at least one of the glass bodies before the depositing step.
8. The method of Claim 1 further comprising deuterating the at least one of the glass bodies before the inserting step.
9. The method of Claim 1 wherein the depositing step further comprises depositing soot onto a pre-deuterated glass handle.
10. The method of Claim 1 wherein the depositing step further comprises depositing soot onto a glass handle, and wherein the plugging step further comprises plugging both ends of the centerline hole of the soot body using glass plugs, wherein at least one of the plugs and the handle is pre-deuterated.
11. The method of Claim 1 wherein the depositing step further comprises depositing soot onto a pre-deuterated glass handle, and wherein the plugging step further comprises plugging both ends of the centerline hole of the soot body using pre-deuterated glass plugs.
12. The method of Claim 1 further comprising overcladding the glass preform.
13. The method of Claim 12 wherein the overcladding step further comprises depositing soot onto the glass preform.

14. The method of Claim 13 further comprising drying and consolidating the soot deposited on the glass preform.

15. The method of Claim 12 wherein the overcladding step further comprises disposing a tube over the glass preform.

16. The method of Claim 1 further comprising drawing the glass preform into optical fiber and deuterating the optical fiber.

17. A low water peak, hydrogen resistant optical waveguide fiber, the fiber comprising:

- a silica containing glass core; and

- a glass cladding surrounding the silica containing glass core;

- wherein the optical waveguide fiber exhibits an optical attenuation at a wavelength of about 1383 nm which is less than or equal to an optical attenuation exhibited at a wavelength of about 1310 nm; and

- wherein the optical waveguide fiber exhibits a maximum hydrogen induced attenuation change of less than about 0.03 dB/km at a wavelength of 1383 nm after being subjected to a 0.01 atm hydrogen partial pressure for at least 144 hours.

18. The optical waveguide fiber of claim 17, wherein the optical attenuation exhibited at a wavelength of about 1383 nm is at least 0.04 dB/km less than the optical attenuation exhibited at a wavelength of about 1310 nm.

19. The optical waveguide fiber of claim 18, wherein the optical attenuation exhibited at a wavelength of about 1383 nm is less than or equal to about 0.35 dB/km.

20. The optical waveguide fiber of claim 19, wherein the optical attenuation exhibited at a wavelength of about 1383 nm is less than or equal to about 0.31 dB/km.

21. A low water peak, hydrogen resistant optical waveguide fiber, the fiber comprising:

a silica containing glass core; and

a glass cladding surrounding the silica containing glass core;

wherein the optical waveguide fiber exhibits an optical attenuation of less than about 0.31 dB/km at a wavelength of about 1383 nm; and

wherein the optical waveguide fiber exhibits a maximum hydrogen induced attenuation change of less than about 0.03 dB/km at a wavelength of about 1383 nm after being subjected to a 0.01 atm hydrogen partial pressure for at least 144 hours.

22. The optical waveguide fiber of claim 21, wherein the optical waveguide fiber exhibits a maximum hydrogen induced attenuation change of less than about 0.03 dB/km at a wavelength of about 1383 nm after being subjected to a 0.01 atm hydrogen partial pressure for at least 336 hours.

23. The optical waveguide fiber of claim 21, wherein the optical waveguide fiber exhibits an optical attenuation of less than about 0.36 dB/km at each wavelength within a wavelength range from about 1300 nm to about 1600 nm.

24. The optical waveguide fiber of claim 21, wherein the core is doped with germania.

25. The optical waveguide fiber of claim 21, wherein the core and the cladding each have a respective refractive index which form a step-index profile.

26. The optical waveguide fiber of claim 21, wherein the fiber is capable of single mode operation at 1550 nm.
27. The optical waveguide fiber of claim 21, wherein the fiber has a cable cutoff wavelength of less than or equal to about 1260 nm.
28. The optical waveguide fiber of claim 21, wherein the cladding glass comprises silica.
29. The optical waveguide fiber of claim 21, wherein the fiber contains no fluorine-based dopant.
30. The optical waveguide fiber of claim 21, wherein the glass core contains no fluorine-based dopant.
31. The optical waveguide fiber of claim 21, wherein the glass cladding contains no fluorine-based dopant.
32. The optical waveguide fiber of claim 21, wherein the fiber is formed from an OVD process.
33. The optical waveguide fiber of claim 21, wherein the silica containing core glass includes a weighted average OH content of less than 1 ppb.
34. A low water peak, hydrogen resistant optical waveguide fiber, the fiber comprising:  
a silica containing glass core; and  
a glass cladding surrounding the silica containing glass core;  
wherein the optical waveguide fiber exhibits an optical attenuation of less than about 0.36 dB/km at each wavelength within a wavelength range from about 1300

nm to about 1600 nm after being subjected to a 0.01 atm hydrogen partial pressure for at least 144 hours.

35. A preform for use in manufacturing optical waveguide fiber, the preform comprising:

- a silica body having a through-hole with two open ends; and
- at least one deuterated glass body disposed at least partially in the silica body, the deuterated body having at least a portion thereof exposed to the hole;
- wherein the preform is capable of being subsequently drawn into an optical waveguide fiber; and
- wherein the deuterated body does not form part of the optical waveguide fiber.

36. An optical waveguide fiber comprising:

- a core region having a centerline and at least two segments having a positive relative refractive index, a refractive index profile, and an inner and an outer radius, the radii being measured with reference to the centerline;
- a clad layer surrounding and in contact with the core region, the clad layer having a relative index and a refractive index profile;
- wherein the optical waveguide fiber exhibits an optical attenuation at a wavelength of about 1383 nm which is not more than 0.10 dB/km above an optical attenuation exhibited at a wavelength of about 1310 nm.

37. An optical waveguide fiber comprising:

- a silica containing glass core; and
- a glass cladding surrounding the silica containing glass core;
- wherein the optical waveguide fiber exhibits an optical attenuation at a wavelength of about 1383 nm which is not more than 0.10 dB/km above an optical attenuation exhibited at a wavelength of about 1310 nm; and
- wherein the optical waveguide fiber exhibits a zero dispersion at a wavelength greater than 1310 nm.

38. A waveguide fiber communications link, having no regenerators and having a bit rate and a length, comprising:

a laser source to provide light signals that have a pre-selected wavelength;

a receiver to receive light at the pre-selected wavelength; and,

at least one length of waveguide fiber having a first and a second end, the first end optically coupled to the laser source to receive the laser light, and the second end optically coupled to the receiver; wherein,

the laser source is chirped, the chirp being either positive or negative, and, the total dispersion of the at least one length of waveguide fiber at about 1380 nm has total dispersion opposite in sign to the laser chirp.